Find the values of the other five trigonometric functions of θ.

1. $\cos \theta = \dfrac{1}{6}, 0 < \theta < \dfrac{\pi}{2}$

2. $\sin \theta = -\dfrac{3}{7}, \pi < \theta < \dfrac{3\pi}{2}$

Simplify the expression.

3. $\sin x \cot x \sec x$

4. $\dfrac{\tan x \csc x}{\sec x}$

5. $\dfrac{\cos \left(\dfrac{\pi}{2} - \theta\right) - 1}{1 + \sin (-\theta)}$

VERIFYING IDENTITIES You can use the fundamental identities on page 924 to verify new trigonometric identities. When verifying an identity, begin with the expression on one side. Use algebra and trigonometric properties to manipulate the expression until it is identical to the other side.

EXAMPLE 4 **Verify a trigonometric identity**

Verify the identity $\dfrac{\sec^2 \theta - 1}{\sec^2 \theta} = \sin^2 \theta.$

$$\dfrac{\sec^2 \theta - 1}{\sec^2 \theta} = \dfrac{\sec^2 \theta}{\sec^2 \theta} - \dfrac{1}{\sec^2 \theta}$$ **Write as separate fractions.**

$$= 1 - \left(\dfrac{1}{\sec \theta}\right)^2$$ **Simplify.**

$$= 1 - \cos^2 \theta$$ **Reciprocal identity**

$$= \sin^2 \theta$$ **Pythagorean identity**

EXAMPLE 5 **Verify a trigonometric identity**

Verify the identity $\sec x + \tan x = \dfrac{\cos x}{1 - \sin x}.$

$$\sec x + \tan x = \dfrac{1}{\cos x} + \tan x$$ **Reciprocal identity**

$$= \dfrac{1}{\cos x} + \dfrac{\sin x}{\cos x}$$ **Tangent identity**

$$= \dfrac{1 + \sin x}{\cos x}$$ **Add fractions.**

VERIFY IDENTITIES
To verify the identity, you must introduce $1 - \sin x$ into the denominator. Multiply the numerator and the denominator by $1 - \sin x$ so you get an equivalent expression.

$$= \dfrac{1 + \sin x}{\cos x} \cdot \dfrac{1 - \sin x}{1 - \sin x}$$ **Multiply by** $\dfrac{1 - \sin x}{1 - \sin x}.$

$$= \dfrac{1 - \sin^2 x}{\cos x \,(1 - \sin x)}$$ **Simplify numerator.**

$$= \dfrac{\cos^2 x}{\cos x \,(1 - \sin x)}$$ **Pythagorean identity**

$$= \dfrac{\cos x}{1 - \sin x}$$ **Simplify.**